

Spring 2002

THE MIND'S EYE

A Liberal Arts Journal
Massachusetts College of Liberal Arts



Meditations on Opinion

By Joe Mazur

Poetry

By Sara Littlecrow-Russell

Giotto's Arena Chapel Frescoes and Religious Theater in His Time

By Charles Parkhurst

Water out of a Woodland Spring

Book Review by Tony Gengareilly

Intellectual Fads

Book Review by Meera Tamaya

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On the cover:
Giotto, Joachim's Vision, c.1302-05

Editor's File

This is our fifth anniversary issue. To help us celebrate, we are pleased to announce the addition of an Advisory Board, as well as the inclusion of two extraordinary articles from outside contributors.

In accordance with our newly expanded mission, we are delighted to welcome a group of distinguished professionals, who will compose the Advisory Board and assist the Editorial Board in its efforts to promote and fund *The Mind's Eye*: Pulitzer Prize-winning historian James MacGregor Burns, Carnegie scholar Mary Huber, Professor of English Stephen Fix, MASS MoCA Director Joseph Thompson, Professor of Law and History Thomas Green and Professor of English emerita Lea Newman. Professor Burns has been a stalwart supporter of the journal's efforts from the outset, and he brings to our mission considerable experience with publishing, as well as a broad range of knowledge. Mary Huber has also been a good friend to the journal and provides a touchstone in a different branch of the academic world. Stephen Fix is another longtime friend whose efforts on the MCLA Board of Trustees helped launch the journal in 1997. Joseph Thompson, director of one of the world's most innovative museums, adds his impressive administrative skills. Thomas Green, as editor and scholar, supplies much appreciated expertise as the journal looks to a national audience. Lea Newman, an MCLA star in the academic firmament, has been a consistent contributor to and inspiration for our efforts. Once again, it is our pleasure to welcome these outstanding people to our ranks and to begin working with them as the journal continues its evolution.

This issue features the work of two outstanding scholars. Joe Mazur's engaging piece, "Meditations on Opinion," is part of a larger work he is currently writing. A professor of mathematics at Marlboro College, Joe has published widely in his field and is now engaged in a more artistic and philosophical reflection on the nature of mathematical truths and related questions. Charles Parkhurst's long and distinguished career has taken him many places as a scholar and a museum administrator. He honors us here with the publication of one of his most memorable lectures and academic studies concerning the work of the 14th-century master artist Giotto. We are also very fortunate to feature the poetry of Sara Littlecrow-Russell. Her insights, drawn from the two cultures in which she is simultaneously living, are riveting as well as enlightening. Finally, the issue is rounded off with two reviews by *Mind's Eye* editors. The first, by Tony Gengareilly, highlights an extraordinary anthology of essays on the work of John Fowles. The second, by Meera Tamaya, provides a humorous glance at the world of academia.

We also wish to acknowledge the efforts of those who have helped and continue to help nurture the journal on its successful journey: President Thomas Aceto, Vice President of Academic Affairs John Frazee, the Board of Trustees, the MCLA Development Office, our copy editor, Arlene Bouras, and members of *The Mind's Eye* Editorial Board, noting especially the efforts of layout and graphics designer Leon Peters.

Meditations on Opinion

BY JOE MAZUR

Before mathematicians consciously process proofs, they unconsciously know something is true from what they see and hear, from instinctual feelings and from rich caches of established beliefs. Those caches may include what they see in symbols and pictures, what they feel from an unconscious sense of logic and what conflicts with established physical and nonphysical experience. It may surprise readers to learn that mathematicians communicate by proofs that omit logical detail and think of the impossible as well as the possible.

"Just the place for a Snark!" the Bellman cried,
As he landed his crew with care;
Supporting each man on the top of the tide
By a finger entwined in his hair.

"Just the place for a Snark! I have said it twice:
That alone should encourage the crew.
Just the place for a Snark! I have said it thrice:
What I tell you three times is true."

—Lewis Carroll, "The Hunting of the Snark"

On a drizzly October afternoon in 1886, Camille Jordan entered a small building behind the Pantheon in Paris to deliver a lecture to his mathematics class at l'Ecole Polytechnique.¹ He had just returned from a circuitous walk to and from the Café Luxembourg several blocks away to retrieve an umbrella that he had left behind. Such short walks to or from his favorite café often inspired clever ideas to help streamline his work or lectures; this time his idea was magnificent. He entered a small mahogany-

paneled classroom through a door reserved for professors and faced 31 students seated in a steep incline of rows. He had taught his famous class many times before; but on that particular afternoon, encouraged by his latest idea, he confidently said something that had an unexpected consequence. He intended to prove a theorem by means of a statement that he had always thought to be obviously true, so he casually relayed it to the class. A vigilant student, seated in the last row, politely interrupted the great professor to ask for more evidence or a proof of what was claimed to be "obvious." Professor Jordan scratched his head, stroked his beard and rapidly blinked his eyes as he nervously removed his wire-rimmed glasses from one ear at a time and thought about how he would convince the class that the simple statement he had made was, indeed, true. After pondering the statement more carefully for several minutes without saying a word, he concluded that perhaps it was not so obvious.

As the hour progressed, the professor's simple statement fell from the obvious into an abyss of vexing uncertainty. The course turned from its usual syllabus to the professor's not-so-obviously-true statement, which turned more and more elusive at every class meeting. Jordan spent the year routinely working each day at the Café Luxembourg, consuming coffee and a large number of croissants on which he would spread spoonfuls of peach jam, trying to prove the truth of his statement. By the following June, he had completed the proof and written it in several hundred pages of notes that were published 11 years later in a 109-page compendium to a three-volume text of his lectures. The simple and obvious statement that Professor Jordan casually made in October of 1886 was, indeed, true. At least it was true for the time being. The story does not end here; we will have more to say about this later.

We often hold opinions without knowing why, and presume them to be true without having definite proof. But proper proof is a process that can either change an opinion or stiffen it into unyielding persuasion. At some unnoticeable point in that process, we start to subconsciously "feel" truth. While a mathematician learns a proof of a theorem, subconscious links are slowly formed between what is being proved and an intricate, gigantic web of connections to old, established theorems in his or her cache. Professor Jordan's feeling of truth for his statement came long before he had any argument to back it up.

How could he have known that the statement was true nine months before he was able to make any conclusively deductive arguments? Mathematics enjoys the honorable distinction of being free from judgment, yet even mathematicians often form strong opinions without bothering to link them to the usual deductive network of known mathematics. Camille Jordan struggled with the forces that separate unsubstantiated opinion from proven fact. Driven by his unconscious instinct to substantiate his hunch, he had to find a way to prove he was right; he started by confusing his initial opinion with a "feeling" of truth and tried to communicate that feeling to others.

The simple statement that Camille Jordan had innocently thought was so obvious when he first used it in his class is the following: "Every continuous curve that begins and ends at the same point without crossing itself divides the plane in two." Surely, a circle is a specific example of the kind of curve Jordan had in mind; it fits the description as a curve that separates the plane into two regions, those points that are inside the circle and those that are outside. If we think about it for a few minutes and perhaps doodle with pencil and paper, we are likely to agree that it is obvious that every continuous curve that begins and ends at the same point without crossing itself divides the plane in two. But mathematicians are very suspicious of claims of the "obvious" without some hard evidence of "truth," even though, more often than not, their intuition turns out to be right. Mathematicians seem to sense mathematical truth! They may use the word "obvious" to communicate a strong belief that a formal proof can be found lurking behind a heuristic argument; after all, the whole notion of proof in mathematics has never been clearly defined. They can make true statements long before formal proofs are found! Perhaps some rough, unconscious proof processing makes certain things feel obvious. So, in presenting a proof, the mathematician comfortably assumes that his or her audience will be convinced, despite the omission of logical detail. But occasionally the omission backfires.

Nobody believes that all triangles are isosceles,² yet Lewis Carroll designed a very convincing argument suggesting that they are. His argument is hard to refute; yet when it is given, our opinion is firm: We refuse to believe it. Though the arguments in favor of such impossible statements may be swaying, we are not convinced. Why? Our experience of life is the driving force of our belief systems. We become

so accustomed to what we believe that we cannot believe otherwise. This is truer in simple mathematics than it is in other areas of thought. Outside the world of mathematics, we often form beliefs and opinions that have little to do with factual truth. Scientific truth involves extraordinarily complex procedures and evidence that often surprise even the most experienced investigators.

Can We Believe What We See?

Even truths that are seen through the eyes can be called into question. When Galileo discovered four new moons orbiting Jupiter, he was admonished because he had observed them with the help of a telescope and had not deduced them from logical arguments. Here is a case where someone is seeing the moons of Jupiter and is told that what he is seeing cannot be true, because logical argument is better than direct observation. Listen to how Galileo is mocked by the Florentine astronomer Francesco Sizzi:

"The Jews and other ancient nations, as well as modern Europeans, have adopted the division of the week into seven days, and have named them from the seven planets: Now if we increase the number of planets, this whole system falls to the ground. . . . Moreover, the satellites are invisible to the naked eye and therefore can have no influence on the Earth and therefore would be useless and therefore do not exist."
(Holton 69)

Galileo was actually seeing the moons of Jupiter with his own eyes, albeit through a telescope. Anyone could have seen the moons had he or she just looked! Extraordinary! Almost 400 years ago, a relatively short time ago, persuasion by logical argument or philosophical principles was considered stronger than persuasion by direct observation. Even seeing through the human lens and retina would have been considered indirect observation; so, surely, looking at the moons of Jupiter through a telescope was even more *indirect*. Yet, for us, we accept what we see as if it were truly *direct* observation. We even go so far as to trust radio waves to bring us pictures of the moon, of Mars and of the bottom of the Black Sea! Why aren't we more doubting?

There are those who refuse to be persuaded, even in the face of enormous evidence. There are conspiracy theorists who believe the

NASA moon landing was a hoax; they interpret evidence to support their own radically revisionist opinions. In fact, these conspiracy theorists were able to persuade the Fox Broadcasting Company to air a special broadcast on the subject. Although the broadcast disclaimed any bias, it withheld information that would have been useful to make reasonable judgments against the conspiracy theory. The program claimed that 20 percent of all Americans believe we never landed on the moon. Is that possible? Sure, Americans rely on printed and broadcast media to shape their beliefs. When a highly advertised special on a major television network puts forward an allegedly convincing story in support of conspiracy, the opinions of its viewers tilt to support the possibility of conspiracy. Conspiracy theorists claim that the entire mission was filmed in a studio, that Neil Armstrong never went to the moon and that thousands of NASA scientists have been part of the conspiracy for the past 32 years. And what is the evidence? Photographs of Armstrong show two shadows, even though the sun should have been the only source of light; so the other source must have been studio spotlights. The photographs show no stars, no blastoff crater and a waving American flag.

Surely, if the mission were a hoax, at least one of the thousands of NASA scientists would have thought of these faults. It turns out that every one of the objections has a scientific explanation that escaped the conspiracy theorists: There should have been more than one source of light (the reflective surfaces of the earth and moon), there should not have been stars visible in the photograph (stars need a time exposure to appear in a photograph), the Lunar Landing Module should not have left a visible crater (moon dust is only a couple of inches thick) and flags wave when their poles are disturbed. In fact, a hoax would have been more likely had there been only one light source, stars in the photograph, a blastoff crater or a nonmoving flag. Perhaps it is easier to believe the mission to be a hoax than to comprehend how difficult it really was. How would Francesco Sizzi react to the NASA pictures?

We tend to believe what we see with our own eyes, and we confirm or deny facts according to what we see, but we see ideas only through our minds' eyes. So David Hume divided all objects of human reason and inquiry into only two categories, "relations of ideas" and "matters of fact" (Hume 40). Mathematics falls under the rela-

tions of ideas category and all other inquiry falls under matters of fact, which implies cause and effect. The Pythagorean theorem relates the sides of a triangle; arithmetic is about relations between numbers. Such mathematical inquiries, Hume claimed, involve thought that is independent of the universe:

Though there never were a circle or triangle in nature, the truths demonstrated by Euclid would forever retain their certainty and evidence. (40)

In contrast, objects of matter of fact come from our experience with cause and effect. Hume suggested that we become accustomed to accepting what we know as if that knowledge has come through reason, even though it really sneaks in through experience. We anticipate events such as the sun rising, fruit rotting and billiard balls colliding without concern about being wrong simply because we have seen the effects and not because we have reasoned from a priori assumptions. At times we form beliefs that are so self-convincing that we take stands based on what we expect from past observations:

Such is the influence of custom that where it is strongest it not only covers our natural ignorance but even conceals itself, and seems not to take place, merely because it is found in the highest degree. (41)

Why do we believe that the earth is "round"? Couldn't it just as well be a drum? At one time, great thinkers saw the earth as a drum floating on water. Did you ever wonder and think about why you *don't* think so? At what point in your life did you come to believe that the earth was roughly a sphere revolving around the sun? If you were born after Apollo 7 sent back the first photographs of the earth rising over the moon, it's likely that you feel that the earth is not a drum floating on water. But what if you had never seen such photographs? At some point in your life, you came to accept, without question, that the earth is roughly spherical and to think that the drum image is primitive. How did you acquire the feeling that the earth is more spherical than cylindrical? Why do you think that it does not float on water? What would your position be if for the past year you heard a barrage of media news telling you that scientists had discovered that the earth is really a drum floating on water? What if scientists at NASA agree

and there is no contest among all the most respected astrophysicists? What if you grew up hearing such impressions of the truth with associated images of the earth? Since our ancestors had notions that were different from ours, it must be that notions about the shape of the earth are taught. But can you think of a time when you didn't know that the earth was spherical? And can you think of a time when you didn't know that two points determine a straight line?

. . . and here, as at the first of time, we lift our heads.

Over us, more beautiful than the moon, a
moon, a wonder to us, unattainable,
a longing past the reach of longing,
a light beyond our light, our lives—perhaps
a meaning to us . . .

O, a meaning!

over us these silent beaches the bright
earth,

Presence among us (Macleish 1)

Immanuel Kant had something to say about this. The first line of his introduction to the *Critique of Pure Reason* says that "there can be no doubt that all our knowledge begins with experience." In the next paragraph, Kant says that "though all our knowledge begins with experience, it does not follow that it all arises out of experience." He goes on to suggest that every human being possesses an a priori universal knowledge that enables him or her to synthesize the impressions of the senses so that they transform into the things that we think we know. We don't notice the component parts of our reasoning because we have become so accustomed to the way we think that we can no longer distinguish the difference between what we perceive and what we infer. Or perhaps we are not aware of our reasoning process because it is so automatic. Kant borrows this example from geometry: The figure that is bounded by three straight lines is immediately known to have three angles; but the fact that the sum of those angles is two right angles is something that cannot be known without being inferred. I suppose that the immediacy of knowing that the three

straight lines have three angles is a priori knowledge. But this knowledge is not limited to mathematics.

Belief Can Alter Memory Just as Well as Memory Can Drive Belief

Some time ago, while writing stories about my childhood, I recalled meeting an extraordinary man. I was eight or nine years old when I witnessed him performing an extraordinary stunt on a street corner near where I lived. He worked for the circus and had the astounding ability of being able to stand on one finger. But something even more extraordinary happened in recalling the event: I was not at all sure that I really had encountered the man! Could my memory have played a trick? Could anyone possibly stand on a single finger? Was it a dream? Could there have been a Mr. Unis? My memory seemed to have concocted a quasi-mythical figure.

Several years after writing my stories, I attended a circus performance: It was a special performance on the 100th anniversary of the Ringling Brothers Circus. I was seated high in the stands of the Boston Garden (now the Fleet Center), where, once again, I saw the very same Mr. Unis. He was not only standing on one finger but also balancing himself on the end of a 30-foot pole! I was astonished! My quasi-mythical figure was not a fantasy! Although I still found it difficult to believe that my meeting with Mr. Unis was real, I became more convinced that it was. Still, there was a shadow of a doubt caused by the sheer physical impossibility of the stunt. When I was younger, I could have believed that a man could balance himself on one finger. Yet once a better knowledge of physics replaced my naive understanding, it became very difficult to believe in things like magic, spirits and humans standing on fingers.

It might seem that we become convinced by repeated exposure to what we see and accept. But it's not that simple. I spent five years taking care of my wife after she had been in an automobile accident involving a truck that ran into her. I saw the accident happen and replayed it in my mind over and over again, thousands of times over a five-year period. What I saw in my mind was an enormous covered truck that was loaded with large boxes. The case went to trial. But in preparation for trial, I was given a picture of the truck. It was a shock to see that it was merely an unloaded three-quarter-ton pickup. The

truck had such a devastating effect on my life that I had “monsterized” its image. It was a fiction of my imagination.

“Look, memory can change the shape of a room. It can change the color of a car. And memories can be distorted. They are just an interpretation, not a record; and they are irrelevant, if you have the facts.”³

Hume put it succinctly this way: “*Belief* is something felt by the mind, which distinguishes the ideas of the judgment from the fictions of the imagination” (63). But this definition leaves much to be explained. It is those “fictions of the imagination” that generally seem to have severely strong influences on “the ideas of our judgment.” Each example above summons those fictions of our imagination to influence the ideas of our judgments. The century we live in renders support to Galileo’s observations. And what are we to make of the conspiracy theory example?

Images of a collapsing World Trade Center are burned into our brains. Passing associations trigger the implausible pictures, while we say, “No, that didn’t happen!” Our minds refuse not only to believe that humans are capable of such heinous acts but also to believe that a building so tall and wide *can* collapse. After all, didn’t the 1993 bombing *prove* that the World Trade Center was indestructible? The World Trade Center collapsing? Isn’t that impossible? My brain still has a hard time believing it. My beliefs are still in conflict with what I saw on television. After all, isn’t television just an advanced extension of Galileo’s telescope?

If there is a distinction between the ideas of the pure judgment and the fictions of the imagination, how fine or strong is that distinction? Mathematics has a reputation for being a pure judgment totally distinct from fictions of the imagination, but is it really? For the moment, let us explore how experience ignites the process that drives opinion to persuasion.

We communicate using statements of some doubt, statements we unquestionably believe and statements that we accept on authority. Of course, there are statements that we cannot judge—we don’t doubt them and we don’t support them. There are also statements that may be true to one observer and false to another. For example, take the statement “Tears are mixtures of water and sodium chloride.” If you

are a poet, painter, fiction writer or psychologist, you may not agree. So is it true that tears are mixtures of water and sodium chloride?

We generally communicate through statements that include words. "Blue is a color" is a proposition that may be true or false. But "x is a y" is a proposition in form only; it has no sense of truth or falsity until both x and y are replaced by words that have meaning. Logicians call the statement "x is a y" a *propositional function*. Its truth or falsity entirely depends on the words substituted for the variables x and y. The trouble is that discourses often contain undefined or ambiguous terms that make propositional functions meaningless, though the speakers most likely intend them to be real propositions. For example, the statement "Tears are mixtures of water and sodium chloride" is not a proposition, because it contains a word that has several meanings. We can even say different things using the same words. An advertisement of Travelocity.com reads "Go virtually anywhere." Permute the words to say "Virtually go anywhere" or "Go anywhere virtually" and you have different meanings.

Ideas are the profits of ambiguities. Words of informal languages such as English are blessed with ambiguities of meaning, leading to misinterpretations of truth on the one hand and the creation of new thoughts on the other. These misinterpretations account for at least part of the reason there are so many arguments and disagreements among people of the same culture. Formal languages, on the other hand, such as computer programming languages and symbolic logic, talk about x being y, and therefore can express definitive conclusions based solely on formal relations among the variables, even though those variables have no meaning at all.

To make things more complicated, our beliefs may simply be influenced by our culture or our ignorance. Take, for example, "A four-leaf clover is very hard to find in a field of clover." You may be convinced that it is true because you have heard that a four-leaf clover is a lucky find. But have you ever tried to find a four-leaf clover in a field of clover? If you haven't, how do you know that it is hard to find? Andrew Weil relates a wonderful story to suggest that belief is a strong influence on what we see. He writes:

Years ago I met a woman who was able to find four-leaf clovers in any clover patch. . . . When I would look through

patches of clover, I could search without success until my vision blurred, and whenever I thought I saw four leaves on one stem, they always turned out to belong to two different clovers. But after meeting this woman and watching her do it, something changed for me. I realized that the key to her success was her belief that in any clover patch there was a four-leaf clover waiting to be found. With that belief, there is a chance of finding it; without it there is none. After meeting her, I began to look again, and soon I started to find four-leaf clovers. (195)

When I was a graduate student, an apocryphal story about the mathematician John Milnor circulated around the mathematics community. One day, when Milnor was an undergraduate at Princeton in the early fifties, the story went, he came late to Ralph Fox's Differentiable Topology class. Fox had written on the blackboard a list of ten of the most outstanding unsolved problems of mathematics. Milnor copied the problems, thinking that they were part of the next homework assignment. At the next class session, Milnor, bashfully embarrassed, told Fox that he had solved nine of the ten homework problems but could not get the tenth. Nobody really believes the full truth of this story, though it is more than likely that some limited version did happen. The point is that Milnor had two significant advantages: One was his extraordinary mathematical talent; the other was that he was not handicapped by any severe sense of difficulty.

Belief is so empowering that it can not only control success but also alter one's future. There are two components to the art of fortune-telling: a vagueness that is open to interpretation and the client's willingness to believe. It is this willingness to believe that, through the power of the mind, can override any vagueness and twist the interpretation to fit whatever happens in the future. The Bellman in the Lewis Carroll nonsense poem "The Hunting of the Snark" believes that what he tells his crew three times is true. Indeed, for many of us, it may be true that we believe what we hear often enough.

"Just the place for a Snark!" the Bellman cried,
As he landed his crew with care;
Supporting each man on the top of the tide
By a finger entwined in his hair.

"Just the place for a Snark! I have said it twice:
That alone should encourage the crew.
Just the place for a Snark! I have said it thrice:
What I tell you three times is true." (182)

It's not just what is told three times but also what one wants to believe. So the fortune-teller concocts a future that includes not only possible experiences but also probable ones. Successful predictions simply depend on willful interpretations, wishful thinking and the passage of lots of time. Include lots of time and you have a high probability that the future will be coincident with the fortune. There is not only a mind-body connection but a mind-future one as well.

Feeling Belief

To say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, or of what is not that it is not, is true.

—Aristotle, *Metaphysics*

Seventy-five years after Camille Jordan finished a proof of his theorem on curves in the Café Luxembourg, I found myself in the same café with another great professor. As an American studying in Paris, I had not been informed of the great reverence that the French had for professors and was dumb enough to simply confront mine with questions. Normally, a professor would lecture to a very large audience after entering the lecture hall from an anteroom at the back of a stage filled with microphones. At the end of the lecture, he would leave through the same anteroom, not questioned and not seen again by the students until the next lecture.

One afternoon, in October of 1961, I was walking along the Boulevard St. Michel with several French friends when I spotted Professor Roger Godement walking toward us. My friends were so nervous about the proximity of God himself that they immediately crossed the street to give him more space. On seeing this strange foreign behavior, I decided to play it for what it was worth and stopped Professor Godement in his tracks. Of course, he didn't know me. I simply said what any courageous American student would say upon meeting his or her professor: "Hello, Professor Godement. I am a student in your algebra class and wonder if I could meet with you sometime to clarify the proof that you talked about in today's class."

To my great surprise, his answer was what any reasonable American professor would have given under the circumstances: "Sure, why don't we have a coffee in that café across the street and I will tell you all about it?" Well, perhaps reasonable American professors wouldn't say this, but at least in America it would not be a surprise if one did. I was not prepared for such a generous offer, but immensely enjoyed witnessing the shock and surprise portrayed on my friends' faces as the Great Professor and I crossed the street and entered the Café Luxembourg.

We sat in the café for more than an hour while Professor Godement explained the proof in detail. At that first meeting, he was as nervous as I was, but we met at that same café several times during the year. I believe we mutually enjoyed our meetings, because he had a rare chance to talk with an undergraduate and I had the chance to show off to my friends. One day Professor Godement turned to me and calmly said, "You know, about seventy-five years ago, Camille Jordan proved this very same theorem in this very same café."

"'Tis the note of the Jubjub! Keep count, I entreat;
You will find I have told it you twice.
'Tis the song of the Jubjub! The proof is complete,
If only I've stated it thrice." (Carroll 197)

I first heard the story of Professor Jordan's curve from James Charmer, my high school geometry teacher. It would have been totally forgotten had Roger Godement not revived it on that afternoon in October 1961. I hadn't believed Charmer's story before the first time I ordered a croissant at the Luxembourg: Without my asking for it, the waiter brought me peach jam.

My first serious introduction to modern mathematics was through Professor Godement's course in modern algebra at the University of Paris. He stated theorems and proved them, one after another. For the first six months of attending his classes, I felt a strange sensation of both understanding the proofs and not knowing why. Some proofs were long, others short, but they were almost all informally worded. Occasionally, the words would form neat sequences of statements that would make the proof easier to follow, but mostly they were rough and unpolished. Yet I understood the overall effect of the argument or proof. For years after, I puzzled over the question of why I could un-

derstand and believe that one statement follows another without being told any of the rules. It seemed as if my brain were wired to accept the rules and that learning them was never necessary. It became clear to me then that there were no fixed rules.

What makes an argument believable? How do we become convinced? In high school, I was taught to mimic proofs that were spelled out in geometry texts. You know the kind: "Prove that two triangles that have their corresponding sides, angles and sides equal are congruent." I was taught to believe that there is some absolute, structural, logical inference that was necessary in order to accept an argument as valid. But real mathematicians don't talk in absolute logical structures. Texts in my high school days misled students to believe that mathematical proofs come from a well-defined process, as opposed to an artful means of communication. Mathematicians communicate with one another by vague symbolic gestures that indicate what should follow from what was just said. A squiggly mark may represent an "Abelian variety," which is an object that has a complex definition. Somehow, it immediately makes perfect sense in conversation between two mathematicians who have experience with Abelian varieties, just as a roughly drawn picture of a triangle might represent a triangle.

Pictures of Truth

Anticipations are a ground sufficiently firm for consent, for even if men went mad all after the same fashion, they might agree one with another well enough. —Francis Bacon

I recently heard a philosopher lecture on visual reasoning in mathematics. Few in the audience had any experience with mathematical proofs, beyond those that they had seen in their high school geometry classes. The audience included anthropologists, philosophers, poets, psychologists, historians and professors of literature, among others. "We may use pictures to convince us of the truth of many kinds of claims," the speaker began. "They are used in geometry classes to show us how to prove mathematical claims," she continued. "Can pictures be considered actual proofs, or are they merely used as symbolic icons?"

A statement was displayed together with a picture:

Statement 1: The sum of the first n odd integers is equal to the square of n ; i.e., $1 + 3 + 5 + \dots + (2n - 1) = n^2$.

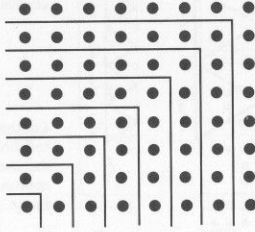


Figure 1

The speaker suggested that the picture (figure 1) is more convincing than the statement, not only because it is convincing but also because it naturally leads to the more formal proof.

She then displayed another statement and a picture of a line of length 1 (figure 2) with divisions in increments of $1/2^n$ and asked if it proved the statement:

Statement 2: $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots + \frac{1}{2^n} + \dots = 1$

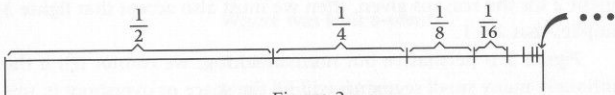


Figure 2

Almost everyone in the group felt that figure 2 proved statement 2 because, as someone said, "the space left between the end of the line and the n th marker was getting smaller and smaller as n increased."

But when the following picture was displayed, everyone rejected it as a proof that "1 equals 2." (The picture is supposed to depict an infinite sequence of "sawtoothlike" figures that converge to a line; that is, the sawtooth edge smoothens out to become the line.)

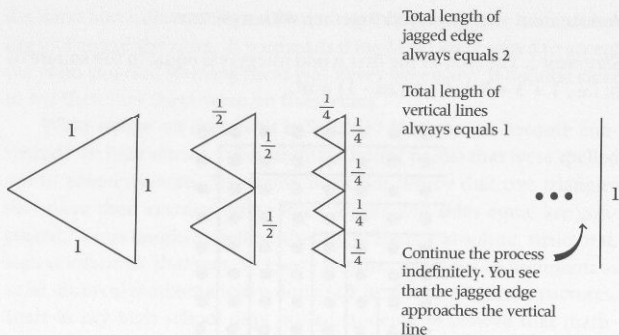


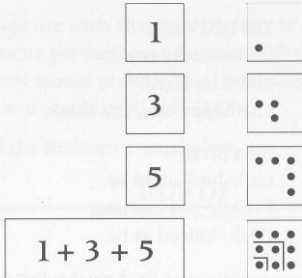
Figure 3

The general consensus was that one could not assume that the slanted lines would actually approach the straight base line even after an infinite number of iterations of the construction. The interesting thing here is that, although the majority of the audience was perfectly willing to accept the picture in figure 2 as proof of statement 2 (reasoning that the remaining space shrinks to zero as n grows large), it refused to accept the picture in figure 3 as proof that $2 = 1$. Of course, one reason for the heightened suspicion is that we know that 2 is not equal to 1, and that knowledge psychologically conditions us to suspect that the picture is misleading. However, if figure 2 implies statement 2 for the reasons given, then we must also accept that figure 3 implies that $2 = 1$.

Figure 2 is persuasive but not convincing; we cannot tell if the infinitely many small segments will fill the space or overshoot it, unless we examine the sum of fractions itself. Perhaps it is not fair to present pictures of infinite processes to a general audience, because one inevitably will fantasize, rather than see, what happens in the infinite tail of the picture.

This leads to the question of how to define "picture." What do we mean by "picture"? What is the difference between the pictures on the left and the corresponding pictures on the right (below)? We have an intuitive understanding of what it means to add two numbers. Therefore, I think you will agree that the pictures on the left give the

same mental impressions as those on the right. But the picture on the right seems to tell us something: It gives us an impression that the sum of 1, 3 and 5 is a perfect square.



Interpretation of a painting will bank on flexible meaning, interaction, history and culture. What you see is what you interpret. But if this picture were a mathematical object, there would be no flexibility in interpretation—what you see must lock into a fixed universal definition. A good poem may also provide flexible interpretation, but since it is composed of words that have meaning, it provides a tighter feeling of interpretation.

A little, pretty bird
Took his flight,
Toward the garden
Where was fruit a-plenty.

If I a pretty
Little bird could be,
I would not hesitate;
I'd do the same as he.

Limetwigs' cunning
Lurks in such a place,
The poor bird
Could no more escape.

If I a pretty
Little bird could be,
I would hesitate indeed,
I'd not do as he.

The bird came
Into a lovely hand,
There he fared,
The happy one, the same.

If I a pretty
Little bird could be,
I would not hesitate;
I'd do indeed as he.

—Johannes Brahms, "A Pretty Little Bird"

What could be felt in reading this poem? Surely, there is a feeling, a feeling for the bird, and a feeling in you the reader, who has identified with the bird. And whose "lovely hand" do you imagine it to be? As you read this poem, images are conjured up in your mind. But there is more! There are feelings both for the bird and for the person with the lovely hand—you, perhaps. Did I call it a poem? Actually, it is a song written by Brahms. If you could hear it sung, it would add another dimension to your feelings. Reading and hearing the song invokes complex sensations that trigger pictures to imagine, which in turn, stimulate feelings of thought.

Good pictures can invoke plenty of useful imagination, insight and even understanding, but more often than not, can lead nowhere or even mislead. Lewis Carroll plays with this thought in "The Hunting of the Snark" where the Bellman presents a map of the sea:

He had bought a large map representing the sea,
Without the least vestige of land:
And the crew were much pleased when they found it to be
A map they could all understand.

"What's the good of Mercator's North Poles and Equators,
Tropics, Zones, and Meridian Lines?"

So the Bellman would cry: and the crew would reply

"They are merely conventional signs!"

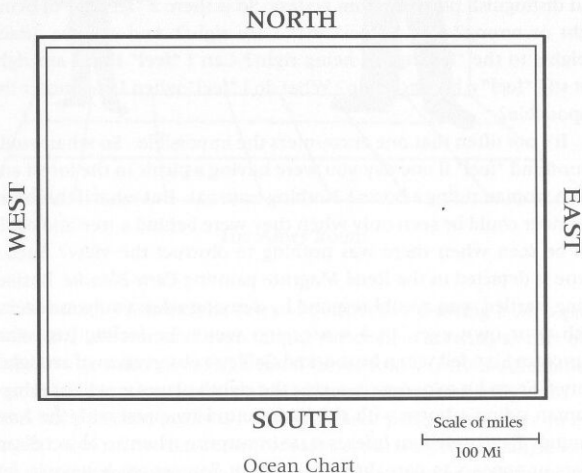
"Other maps are such shapes, with their islands and capes!

But we've got our brave Captain to thank"

(So the crew would protest) "that he's bought *us* the best—

A perfect and absolute blank!" (185)

See picture of the Bellman's map below.



One Can't Believe in Impossible Things, Can One?

Alice laughed: "There's no use trying," she said; "one can't believe impossible things."

"I daresay you haven't had much practice," said the Queen. "When I was younger, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."

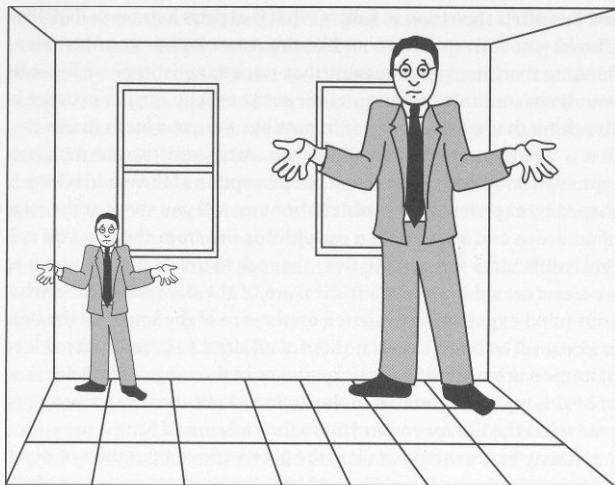
—Lewis Carroll, *Alice's Adventures in Wonderland*

Is there a feeling to being convinced of an argument? We normally associate feelings with pleasure or pain, or any of the other senses of the skin triggered by touch, but a more general meaning includes mood and emotion. What did Hume mean when he said, "Belief is something felt by the mind"? To push it further, it can also be connected to thinking and belief, or doubt. One may say, "I 'feel' that I am right," when faced with a belief. What do we "feel"? Surely, we don't "feel" belief or doubt through physical sensation. The feeling of pain is physical and can be measured by degree. We can describe and distinguish mild pain from torture. To a lesser degree, we can even describe and distinguish pleasure from ecstasy. So is there a "feeling" of being right or wrong? Can I "feel" that I am right? And can we attach weights to the "feeling" of being right? Can I "feel" that I am right but still "feel" a bit uncertain? What do I "feel" when I encounter the impossible?

It's not often that one encounters the impossible. So what would your mind "feel" if one day you were having a picnic in the forest and saw a woman riding a horse? Nothing unusual. But what if this horse and rider could be seen only when they were behind a tree and could not be seen when there was nothing to obstruct the view? Such a scene is depicted in the René Magritte painting *Carte Blanche*. Besides being startled, you would respond by denying what you were seeing with your own eyes. In a sense, you would be feeling just what Francesco Sizzi felt when he mocked Galileo's observation of an eighth planet. From his experience, seeing the eighth planet was like seeing a woman riding a horse with the background swapped with the foreground. Even newborn infants stare in surprise when an object disappears or appears to pass through another. You cannot believe in impossible things!

"Who'a ya gonna believe, me or your own eyes?"

—Chico Marx



The Ames Room

Although I learned the rules of perspective drawing from a professional illustrator, and even taught perspective drawing as part of a projective geometry course, I could never find a truly mathematical way to fix the correct impression of depth along vanishing lines. It turns out that there really is no way, because perspective relies on the projection of points that come from rays emanating from a single vanishing point, and a projected point on a ray could have come from any point along that ray. Parallax is not the correct answer to how we are aware of depth, for it does not explain how we falsely perceive the so-called Ames Room,⁴ a room constructed in such a way that a short person appears taller than a tall person does. But how does the mind perceive such false readings? Surely, when we walk into a familiar room, we have a preconceived sense of its space and that sense gets registered somewhere in the brain as an *expected* space, a room where floors, walls and ceilings make right angles with each other. We very rarely see rooms that are built to deceive us. So the mind records "room"

and interprets the vision to follow what it expects a room to look like. Should you encounter a room like the Ames Room, your conscious thinking machinery will suggest that something is impossible while your brain continues to interpret the scene exactly as your eyes see it. You think that what you see is impossible, yet your brain insists that that is what your eyes are truly seeing. Ames constructed such perceptual tricks to demonstrate that our perception of the world is largely shaped by experience with our environment. If you stand at the edge of an ocean and look out at a rock jutting out from the sea, you will find it difficult to say how far away the rock is, unless there is a boat or a person near the rock. Your measure of the distance will be what your mind expects it to be, based on the size of the image of the boat or person. The brain has seen rocks of all sizes, so it has no fixed idea of its measurement. But your experience of the range of sizes for man or boat is relatively limited, so the brain can use those ranges to compute what the distance from you to the rock *should* be.

It may be true that parallax, the geometric computation of depth using a pair of eyes focusing on objects in the distance, is one of the brain's tools for perceiving depth, but the brain also has a backup plan. In fact, the brain continuously computes depth from probabilities based on information supplied by experience with the visual field. What this means is that the brain does not necessarily rely on one method of information processing but can resort to a variety of alternatives should it need to do so. It also means that our physical experience plays an enormous role in how we intuit new things. It could also mean that our logic depends on the continual bombardment of cause-and-effect experiences of the past. But coincidences often confuse those experiences. Tolstoy suggested that some people are quick to link effect to cause when the real connection is simply coincidence:

The peasants say that in the late spring a cold wind blows because the oak-buds are opening, and, as a fact, a cold wind does blow every spring when the oak is coming out. But though the cause of the cold wind's blowing just when the oaks are coming out is unknown to me, I cannot agree with the peasants the cause of the cold wind is the opening of the oak-buds, because the force of the wind is altogether outside the influence of the buds. (768)

We are bombarded with such compelling connections daily and our vulnerable impressions are constantly competing with the forceful powers of coincidence and the convenience of its inert preference for acceptance. Again, the mind has amazing capabilities for changing its own mechanisms. I can think about thinking and think that I should think differently, though it is not always an easy thing to do.

When we view an Ames Room, we see exactly what we are supposed to see. We see the true visual field that is in front of our eyes. But we lose a sense of measure: We can no longer see two equal things as equal. So what is true? Yes, the two figures in the Ames Room may be the same height, even though we do not see them as being the same height. And yet we see exactly what is really there!

So the mind has a big task: to interpret perceptions of the world so that the body can live without contradictions. What we see with our eyes does not necessarily have to be truly what exists; it has only to be consistent with how the world moves. There are solid objects out there. We can perceive them in any old way, as long as we don't crash into them and create havoc. If I drive through an intersection and don't see a truck crossing in front of me, I am in trouble. Do I not see it because it is not there, or do I not see it because it is there and I perceive it to be a hundred feet away from where it really is? If I walk through the woods and see someone riding a horse in a background confused with foreground, does my brain reinterpret what I am seeing so that the world makes sense, or are the horse and rider really woven between the trees in the background and the trees in the foreground like the horse and rider in a Magritte painting?

When I look into the Ames Room, I instantly know that what I am seeing is an illusion, that my eyes are deceiving me and that I must think of some reason why I am seeing something false. In other words, the brain knows something that the eyes don't.

So why shouldn't we expect our mathematical intuition to work the same way? It's reasonable to suppose that it comes in cycles built from syntheses of compelling logic schemes, experiences with the environment and more primitive mathematical intuitions. We can imagine things that do not really exist in the physical world, such as Platonic triangles. How? Typically, we do it by picturing any old triangle and ascribing the mathematical properties of a triangle to it. I

may have learned in grade school that a triangle is a figure with three sides and three angles. After learning that, I probably found out that the sum of the angles of *any* triangle is 180 degrees. Much later I learned about the properties of right triangles, the Pythagorean theorem, the law of cosines, etc. Every thought of a triangle changes my intuitive concept of triangleness. The triangle that I see in my mind's eye must be interpreted to make mathematical sense. It may be a figure that has no straight lines! Or it may be a figure that looks like a lady riding a horse through a Magritte woods! What I imagine doesn't matter, if my brain interprets the image in a way that makes mathematical sense.

When I hear some false argument about a triangle, I may not be able to immediately pinpoint what part of the argument is false, but I know that *some* part is false. My brain will not accept the argument. To refute Lewis Carroll's demonstration that all triangles are isosceles, we need only exhibit one triangle that is not isosceles; but few persons can pinpoint the place where his argument breaks down. Carroll's argument uses a little trick, well known to magicians. It gets us to look away for a moment. His argument deals with two cases; and it is true that there are only two cases: Either a certain two lines meet or they don't. Hey, what could be more representative of the law of the excluded middle?⁵ So we walk away thinking that we have fully investigated the only two possible cases. And we have! But where do those two lines meet? We are fooled into following the picture that *he* presents, with an intersection point *inside* the triangle, while all the while the intersection point may have fallen outside the triangle.

Could Professor Jordan Have Been Wrong?

Search in and out and round about,
And you'll discover never
A tale so free from every doubt—
All probable, possible shadow of doubt—
All possible doubt whatever!

—Gilbert and Sullivan, *The Gondoliers*

Just when Camille Jordan thought he had completed his lengthy proof, Giuseppe Peano, teaching at the University of Turin, invented a peculiar curve. Professor Peano's strange object satisfied all the traditional requirements of the definition of a curve but was so peculiar that even Camille Jordan had not accounted for it in the proof of his theorem. Peano's invention put a hole in Jordan's proof. So Jordan went back to his favorite café and scribbled out another hundred pages of proof to accommodate Peano's invention. Again, what Jordan thought was true in October of 1886 was true, at least for the time being. And once again, the story does not end here.

On first glance, you might say, just as Jordan did, that "of course this theorem is true!" Trouble comes only when you try to use your intuitive experience of space to prove something that depends on precise definitions. We tend to confuse the spatial model of a curve with the abstract definition of a curve. We haven't seen all the possible contortions that Jordan's curves could go through. But more important, we don't even know what a curve is!

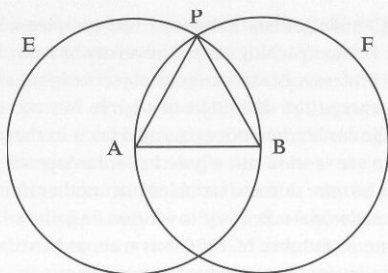
Twenty-three-hundred years ago, mathematicians and philosophers struggled with the idea of defining terms such as *point*, *line* and *circle*, mathematical objects that come from experiencing our spatial world. Euclid decided to define a point as "that which has no part." Not a very satisfactory definition from a modern point of view, but surely one that is better than Plato's: "A *point* is that of which the middle covers the ends," whatever that means. (His definitions for straight line and circle are not much better.)

Euclid's First Proposition

Proposition One: An equilateral triangle may be constructed on a finite straight line AB.

A ————— B

To prove it, Euclid had to use five postulates to construct two circles of radius AB, one centered at A and the other at B. He then marked one of the points of intersection as P and constructed two lines, one from A to P and the other from B to P.



But what right did he have to assume that the intersection point P exists? How do we know that the two circles actually intersect each other? You would say, "How could the two circles *not* intersect?" If mathematics is axiomatic and a system of arguments that follow from each other, then we should not accept Proposition One as valid, for there is no argument that tells us that the intersection of the two circles used in the proof exists. The problem is that we find it hard to believe that the intersection does not exist. How could it not exist? Is there something to worry about? For more than 2000 years, we felt confident that the proof of Proposition One was valid. But it "feels" obvious that the two circles intersect. In this sense, we "feel" truth. We "know" that the proposition is true, because we are so convinced; and the small detail of conceiving a possible way for the two circles to not intersect should not really get in the way of our believing the proposition.

And yet. . . !

Those circles are imagined as part of the real world of circles. In the 19th century, mathematicians realized that the real world does not matter. Mathematical systems were invented without regard to the real world. We now know that the fifth postulate of Euclid could be replaced by a postulate that states that "there are *no* straight lines parallel to a given straight line." This may sound false; but if you replace Euclid's fifth postulate with this new one, you have a new system that is logically consistent and one that gives a whole new geometry. The geometry may not be that of the world we are used to. And so our intuition can play tricks on us. We have a much harder time accepting statements in this new geometry and must resort to checking things not by "feelings" of truth but by clear, logical inferences.

Jordan's Theorem Once Again

Professor Jordan thought that his proof was correct. He accommodated Peano's curve in the latest version of his proof and felt convinced that all was well. A year had passed while his proof circulated through the mathematical community. Alas, just when Jordan was feeling quite good about his theorem, David Hilbert, chairman of the Mathematics Department at the University of Göttingen, invented another anomalous curve that Jordan had not considered. Again, the proof was destroyed.

The chronicle of Jordan's proof continues with several distinguished mathematicians of the time giving proofs that were eventually found to be incorrect. Oswald Veblen was 25 years old when he went to Princeton from Chicago. In 1905, 19 years after that one student in Professor Jordan's class hesitated to accept the statement as obvious, Veblen gave the first correct proof. It was only 15 pages long (Veblen 83–98). Once again, the theorem was shown to be true. But hadn't it been true all along? And if it had always been true, how could Jordan have known it to be true without having a solid proof?

Jordan's story seemed to have no end. My belief in it came through totally coincidental events. Jacques Azerad, a man in his early 50s at the time of this story, was a professor of medicine at the University of Paris Medical School. Like his father, he was a distinguished cardiologist. One day, while I was hitchhiking to class, a handsome man with a thick black mustache stopped his tiny three-wheeled vehicle to give me a lift. We arrived close to the university with time to spare for a beer at—of all places—the Café Luxembourg. In my awkward uneasiness and broken French, I told the story of Jordan's endless work at the café. Dr. Azerad politely listened with a gaze of excited interest, and when he learned that I was looking for an affordable apartment in Paris—to my great surprise—quickly offered a room in his apartment.

In exchange for living with the doctor and his beautiful wife, I would be obliged to have Sunday suppers with them, and twice during the year—once at Christmas and again at Easter—to take a tour of France en route to the Azerad villa in St.-Tropez. We would take our Sunday meals at different auberges, generally outside Paris. My room on the third floor was small but bright, opening onto a courtyard with large trees and a view of the concierge's office below. A barber's chair

sat in one corner near the French doors, so I could spend long Sunday afternoons reading while listening to music and feeling the breeze through the lace curtains in front of the opened doors.

As if fine dining every Sunday were not enough for my benefactors, I also had to accompany Jacques and his entourage to concerts and operas. For our out-of-town trips, we would stay in five-star hotels and gracefully drink fine wines at the level of a 1945 Château Gruard-Larose or a 1955 Château Montrose. I was not the only one living with the Azerads. Jacques had a habit of inviting fascinating people to live in his sprawling residence. A studio was specially built for Pierre Languet, a postexpressionist painter who had been carrying on a visibly open affair with Mme. Azerad, a brilliant professor of medicine who wore tight-fitting clothes to reveal her Junoesque body. Pierre was arrogant. He once rejected a bottle of Francis Darroze Bas Armagnac Aux Ducs, just to see the reaction of a wine steward, who confidently waited for an opinion of the sample. There was François Merlot, a young dancer who debuted in *West Side Story* and spent part of the year in New York working for Alvin Ailey. Jean Paul Druhpf, first violinist with the Paris Orchestra, was in charge of our dining itinerary. Every Sunday at six P.M., we would meet in the foyer of the apartment for an aperitif before the evening out.

To this day, I wonder why the good doctor was so kind to me, a total stranger. Months went by while I suspiciously pondered sinister motives. But he never asked for a favor in return. He simply took an interest in my studies and me. He regarded himself as being a patron of resident artists and scholars. I was his resident mathematician.

"Meet my father," Jacques said to me when we arrived at his villa in St.-Tropez one day.

A very thin, tall and distinguished old gentleman, with a slightly bent frame, extended a hand with a broad smile that suggested that he already had heard much about me. I greeted him while Jacques explained that, though his father was a physician, he had studied mathematics when he was younger.

"Oh, yes," exclaimed the gentleman, "I studied at l'Ecole Polytechnique, but that was long ago."

At dinner that evening, I could think of nothing to say, and so chanced to tell the story of Camille Jordan, just as I had heard it twice before. He listened with great interest, expressing himself by tilts of

his head, strokes of his forked beard, brief smiles. When I had finished, he glanced at Jacques and rhetorically asked, "That student who interrupted Professor Jordan to ask for more evidence?"

"Yes?" I asked, expecting an answer.

But an answer never came. If there were to be an answer, it would have to come from his continued broad smile of delight that indicated it had been a long time since he had heard that story.

The Beaver had counted with scrupulous care,
Attending to every word:
But it fairly lost heart, and outgrate in despair,
When the third repetition occurred. (Carroll 197)

Notes

- ¹ The renowned Cours d'analyse de l'Ecole Polytechnique.
- ² An isosceles triangle is a triangle with two sides of equal length.
- ³ From the part of Leonard Shelby, the protagonist in *Memento*, a film by Christopher Nolan based on a short story by Jonathan Nolan.
- ⁴ After the painter-psychologist Adelbert Ames, Jr.
- ⁵ A fundamental proposition of logic that says that something is or isn't, and that there is nothing in between.

Works Cited

- Brahms, Johannes. *Liebeslieder Walzer*, Opus 52. Trans. Philipp Naegele. Marlboro, VT: Marlboro Music Festival, 2001.
- Carroll, Lewis. *The Complete Illustrated Works of Lewis Carroll*. Ed. Edward Guiliano. New York: Avenel, 1982.
- Holton, Gerald. *Introduction to Concepts and Theories in Physical Science*. Reading, MA: Addison-Wesley, 1952.
- Hume, David. *An Inquiry Concerning Human Understanding*. Ed. Charles W. Hendel. New York: Macmillan, 1955.
- Macleish, Archibald. Poem. *New York Times* 29 July 1969.
- Tolstoy, Leo. *War and Peace*. Trans. Constance Garnett. New York: Modern Library, 1950.
- Veblen, Oswald. *American Mathematical Society Transactions* 6, 1905.
- Weil, Andrew. *Spontaneous Healing*. New York: Knopf, 1995.

Four Poems

BY SARA LITTLECROW-RUSSELL

Indian Territory

Part I—Smells

Horse shit drying on work boots,
Sweetgrass and dollar cigarettes
curling into aromatic spirals,
Old star blankets releasing
their stale mustiness into body heat,
Slow-cooked commodity beans
bubbling on a cast-iron stove,
A warm road-kill deer being butchered
on the kitchen floor.

Part II—Tastes

Old pots and pans brewing coffee
tasting faintly of tinfoil,
Raw beef kidneys
dissolving slowly
like gamy Jell-o,
Melted, stolen candy bars
sweeter than the tiny wild berries
that grow between the rusty cars.

Part III—Sounds

A truck engine
grinds over and over,
Fry bread sizzles in hot lard,
An owl shrieks across the valley,
High-voltage wires hum a lullaby,
Bottles clink in the living room,
Soon there are thuds against the wall
as the fighting begins.

Love Song from a Silent Flute

You are the old beadwork
That I mend with cautious,
Needle-pricked fingers.
You are burning *chaga*,
Raw sweetness scraping my lungs
And startling tears from my eyes.
You are the bear-claw necklace
No longer caressing
The space between my breasts.
You are the cigarettes
That I quit years ago,
But sometimes smoke anyways.

You are the cedar branch
That sweeps away my footprints
And hides me from danger.
You are maple syrup on snow
Melting on my tongue
Until I ache with cold.
You are the eagle wing
Sheltering me from
An urban thunderstorm.
You are the star blanket
Sliding off the bed at night
And leaving me shivering in the morning.

You are the stubborn braid of *wiingashk*
That must be relit with a dozen matches
Before it releases its thin streamers of sweetness.
You are the love song that I play on a silent flute.

I Will Take Anyone to Bed (Poetically Speaking, of Course)

I have made love with Pablo Neruda
On the heights of Machu Picchu
I flashed the tattoo on my thigh
And hitched a lowride with Luiz Rodriguez
I have held Adrian Louis close
And danced a wild reservation two-step
Until beer cans and disposable diapers
Spun around us like stars.
I have surrendered to Leonel Rugama's
Burning adolescent heat
And caressed Roque Dalton
From a luxuriance of bedsheets and red wine.

Once I stayed up all night reading Sherman Alexie,
Nine months later, I gave birth to twin poems.

This lust for poetry is by no means heterosexual.
I devour Nikki Giovanni and Patricia Smith
Like they are made from the finest chocolate.
I have been known to steal away for
An afternoon tryst with Julia de Burgos.
I wrap Nellie Wong around me like a silk robe.

Tonight, I have a date
To share a steamy bath
With Linda Hogan and Joy Harjo
And let me tell you
It's gonna be goooooood. . . .

Stop Welfare: The Middle Class Is Going Broke

Her shiny, white bumper
cuts with the angry slash of red—
“Stop Welfare: The Middle Class Is Going Broke”
I want to get out of my car
to tell her that
my \$565 a month for two kids
ain’t got nothing
on \$104.3 billion a year
called Corporate Subsidies,
but her face is closed up with hate
for her work,
for her graying hair,
for her day-care bills,
for my dirty car,
and my tired clothes.

I want to talk to her,
but I know she will never understand
that my \$565 a month and two kids
Is not why her full-time job
only pays half her bills
so I sneak out with a marker
and write “corporate” between
“stop” and “welfare”
then quickly drive away.

Giotto's Arena Chapel Frescoes and Religious Theater in His Time

BY CHARLES PARKHURST

Many readers are familiar with the great narrative frescoes by Giotto in the Scrovegni Chapel, on the Arena in Padua, which were consecrated in 1305. To promote a developing line of thought about these paintings—that Giotto's roots lie deep in some theatrical tradition—I delivered a paper at the annual meeting of the College Art Association in San Francisco in 1989 that provides the basis for this article. In recent times, scholars have discussed the narrative sequences of the frescoes with regard to their cyclical organization, literary sources, realism and their many dramatic qualities. In this essay, I offer a new look at these features. Each has a bearing on my objective, which is to open a discussion of the relationship between Giotto's frescoes and the staging of religious plays in his day.

Late Medieval Sacred Drama

To understand Giotto's narrative cycles at the Arena Chapel, we must know more than we do at present about sacred theatrical representations in the late Middle Ages. Hundreds of such plays are extant from Giotto's time. The earliest plays we have are liturgical dramas, performed around the altar in churches of the tenth century, among them a simple version of the Easter play in a manuscript from St. Gall, with a text that is not liturgical but consists of biblical paraphrase, written as embellishments prefacing the Easter liturgy. This play was depicted by a miniaturist of the same period in another St. Gall manu-

script, which shows that the tradition of illustrating liturgical plays, and possibly depicting them without text, may have been established by about 950.

Subsequently, plays were written for other feasts. Later these sacred representations moved out of the church, into the squares and public courtyards of towns, and increasingly were written in the vernacular. Most distinctive in the development of sacred theater is the tendency of playwrights to link individual plays from the church calendar to form cycles. Also, there emerges a marked preference for plays composed on a more ample scale, with notable advance in imaginative elaboration and, consequently, considerable increase in length.

From northeastern Italy come the most famous historical references to play cycles. These are from the *Cronaca Friuliana*, written by canon Giuliano da Cividale in the 14th century. The Friuli is the land at the head of the Adriatic, between Padua and Cividale, an autonomous commercial city on the road northward from the sea to the Germanic lands. This city was the chosen residence of the patriarch of Aquilea, whose jurisdiction at certain times included Padua. Moreover, Cividale was called "Civitas Austriae," and was also the residence of the patriarch of Austria.

There are two entries under the dates 1298 and 1300 in Giuliano's chronicle that confirm that cyclic theater in northeast Italy had reached something like its full dimensions by about 1300. I translate the second, which is similar to but longer than the first:

In the year of our Lord 1303 there was performed by the clergy, or by the lay chapter of the city, a play, or rather plays, as recorded below: in the first place a play about the creation of our first parents; next about the Annunciation to the Blessed Virgin; about the Nativity with many circumstances; and about the Passion and Resurrection; the Ascension and the Advent of the Holy Spirit; and about the anti-Christ and others; and finally about the coming of Christ to the Judgment. And the aforesaid plays were performed solemnly in the courtyard of my Lord the Patriarch at the Feast of Pentecost and the two days following, this being the 15th of May. . . .

Stagecraft and Staging in Late Medieval Religious Theater

As Hardison wrote, in the late Middle Ages, good religious drama was a felt experience, like good drama elsewhere; but it also was a source of instruction for the layman, intensified by explicitly mimetic acting, in real settings and in real time. Medieval *Sacre Rappresentazioni*, as they were known, sought reality through illusion. Actors were required "by instruction" to have a physical resemblance to persons they represented, and to express themselves in fitting dialogue, reinforced through posture, gesture, action, vocal inflection, costume and makeup. In short, those who played roles had to strive for convincing, and consistent, characterization. Anachronism was another form of verisimilitude in medieval drama, for events and settings were often updated, and the playwright used his experience as a guide when historical improvisation was necessary.

From theater archives we learn that play production in the late Middle Ages included arranging for the play, finding the text, organizing the performance, costuming, selecting the stage crew, providing for the audience and, perhaps most important, appointing the director, the musicians and the painter. These documents also reveal subsequent requirements: sets, machinery, special effects, movement of actors, crowd effects, mime and gesture, accounting income and expense, storage and repair for the next year's performance, selling off and cleaning up.

Stagecraft and Staging in Giotto

Staging by Giotto in his Arena Chapel frescoes can have been no less complicated. He sets each of his two cycles—"Life of Mary: Her Parents and Her Baby" and "Life of Christ: His Mission, Passion and Death"—with a separate group of modular stage properties that is used only within its proper cycle. The number of scenes presented on any set varies, increasing in number in the latter part of the Christ cycle. The "stage" itself, with drab dark-brownish floor (when visible) and blue backdrop, is constant.

For the 19 scenes of the Mary cycle¹ there are but six sets:

Set 1. Five scenes with variable rocky terrain as in *The Flight into Egypt* show low gray rocks that can be walked or climbed upon, but background mountains are never invaded. A prop may be used to identify further the nature of the landscape, such as the sheepfold in

Joachim's Return to His Flock and in *Joachim's Vision* (fig. 1), and the tallest peaks are moved about from scene to scene.

Set 2. Anna's cubic one-room house, with a curtained bedroom, a porch and upper deck with staircase, appears twice, first in her *Annunciation* (fig. 2). It is frontal, but with the front wall removed and the side walls squashed on one diagonal perhaps to fit the stage and, at the same time, to conceal the angel until its appearance at the window. This house is used again in *The Birth of Mary*, four scenes later.

Set 3. A post-and-lintel shed seen in *The Nativity with Shepherds* is held over for *The Adoration of the Magi*, with an accurate image of Halley's comet seen against the blue backdrop. (Giotto very likely witnessed the passage of this comet over northern Italy in 1302.)

Set 4. An exedra with an altar and two side chapels is employed in four scenes: *The Presentation of the Rods by Mary's Suitors* (fig. 3), followed by *The Suitors Watching the Rods*, and then *The Betrothal of the Virgin*. It is brought back for the final childhood of Jesus scene, *Jesus Disputing with the Elders*.

Set 5. A spectacular set for *The Rejection of Joachim's Offering* (fig. 4) initiates this "Life of Mary" cycle. (To this very day, an audience enjoys applauding a designer's opening set.) It offers a rich sacred enclosure, in the much earlier Roman tradition of monks' choirs, assorted marbleized panels on a low platform, within which is a clothed altar and a chest beneath an arched tabernacle with spiral supports and a pyramidal top. Beyond is a marbleized ambo supported on colonnettes with a staircase, the two flights of which take a turn after about six steps up. At the right, Joachim, his offering spurned, is about to be shoved rudely onto the drab floor of an empty stage.

This set reappears in *The Presentation of Mary* with a change that is deceptively simple: It is reassembled in the same conformation but rotated 90 degrees on the stage so that its nether side is toward you; the ambo, with its dogleg flight of steps, is thereby brought to the front and its topmost platform swung broadside. In addition, the set is now elevated on a higher stylobate of marbleized panels with the flight of steps required for this scene.

There is yet a third use of this set in *The Presentation of the Child*, wherein only the altar and tabernacle are returned to the stage, this time on a low socle, set at still another angle relative to the audience.

Thus, in the Mary cycle, there are but five basic sets for 18 scenes,



Figure 1: Giotto, *Joachim's Vision*, c.1302–05



Figure 2: Giotto, *The Annunciation to Anna*, c.1302–05

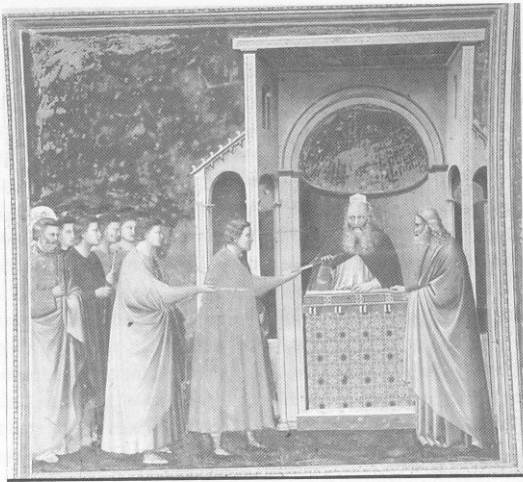


Figure 3: Giotto, *The Presentation of the Rods by Mary's Suitors*, c.1302–05

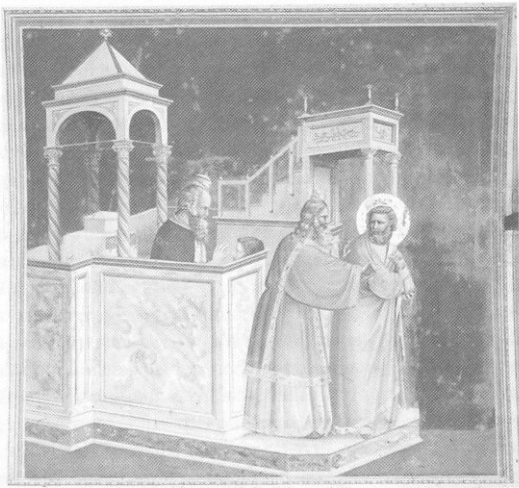


Figure 4: Giotto, *The Rejection of Joachim's Offering*, c.1302–05

plus one unique set, which I will discuss below. As to cast, this cycle has six principals, six supporting players, five angels, for a cast of 17, plus ten extras and about 24 walk-on animals and two doves. (I will not analyze the Christ cycle, where the same principles apply, but will refer later to one or two scenes.)

The unique sixth set just referred to is for *Joachim and Anna at the Golden Gate of Jerusalem* (fig. 5), which belongs to this cycle because of the presence of the parents of Mary. To further the reader's understanding of Giotto's stagecraft, I introduce my own stage model for this play, in which I visualize an approximation of Giotto's Golden Gate scenery as it would be viewed from a spectator's position and proportionally framed as in Giotto's frescoes (fig. 6). The model consists of three parts: a towered gate, a painted flat visible through the gate to suggest the city within and a side rail for an arching bridge. Giotto's prototype for the Golden Gate, I believe, is *L'Arco Etrusco* in Perugia (fig. 7). This ancient northern gate has been part of the defensive wall of Perugia since at least 300 B.C.E. and many times repaired and restored. Today it still spans via Flaminia, the ancient cross-country highway leading from the Forum in Rome, up the Tiber Valley to Perugia and beyond, northward. Its appearance in Giotto's frescoes suggests that the inspiration he took from his own ambience included architecture as well as theater. I must also call your attention to a telling detail in the staging: Anna is standing not on the rising bridge, as you are meant to suppose, but on the brown plane of the stage, for her feet are at the same level as Joachim's.

A conspicuous feature in nine scenes of the Mary cycle is a pulpit or other accessible high place, which, though depicted by Giotto, is not utilized by him in a scene. Why is it there? The only explanation I can offer is that these high places in a setting had a use in the play, but not at the dramatic moment Giotto depicted them. For example, the great opening scene of the Mary cycle (fig. 4) has an ambo, an accessible high place with steps. Now, every sacred representation opens with a salutation by an angel who comes on stage *annunziare la festa*, and to explain in song what the audience is about to see. Explicable only as a theatrical element, the ambo's appearance in Giotto's frescoes confirms that he was deeply informed by those traditions.

I deduce the following about Giotto's stage, as it would be without sets. First, it has a dark brown or sometimes dingy terre verte floor,

with no material identification. Perhaps it is packed earth or painted cloth. Second, it has a blue backdrop or wall, which does not change with respect to any attribute or property of blueness. Third, the stage dimensions are sufficient to accommodate as many as 21 or 22 actors, with props. Fourth, your eye as a spectator is uniformly about mid-level of the scene, which is the eye level of the principal actors. This also explains the prevailing isocephaly, and permits the conclusion that the stage is at ground level. Your position is otherwise not fixed, and you are free to move right or left in the nave of the chapel. Last, calculating from figure size, I estimate that the area of Giotto's stage is about 150 square feet—about 15 feet wide at the front and 10 feet deep (see the stage shown from the front [fig. 6], and a rear view as well with support scaffolding, platforms and ladder [fig. 8]).

I call your special attention to three other features in Giotto's frescoes that relate to staging: lighting, special effects and crowd scenes. Regarding the first, the lighting suggests daylight, as it would be in outdoor theaters on clear days, when performances could be given. How do we know this? In the frescoes, as in nature, as has been previously suggested by others, light is revealed by color alone: direct light by strong color on salient bodies, graded as necessary up or down; circumferential and diffused light by subtly grayed hues in the penumbra. Nothing is obscured by darkness. Moreover, as Paul Hills has elucidated, Giotto causes this painted or fictive light to be congruent with the real light of the chapel. That is, it either seems to come bright and direct from the high west window or is less bright and diffused, pooling shadows under simulated overhanging projections in the settings. This is a large part of Giotto's celebrated naturalism.

Second, special effects and *deus-ex-machina* arrangements are evident in 12 scenes, of which eight include airborne angels. I propose that Giotto's theatrical solution was not the then commonplace wires or thin ropes worked on windlasses but rather a system of his own invention. Close examination of a flying angel (fig. 1) reveals that its head and shoulders are depicted as three dimensional, whereas the rest of its body and its wings appear flat and to evaporate "into the blue." My surmise is that this putative angel, supported on a platform of the scaffolding behind a special, slitted blue backdrop (fig. 8), thrust its head, shoulders and arms through a slit next to which its wings and tail were either affixed as attachments or painted directly on this



Figure 5: Giotto, *Joachim and Anna at the Golden Gate of Jerusalem*, c.1302–05

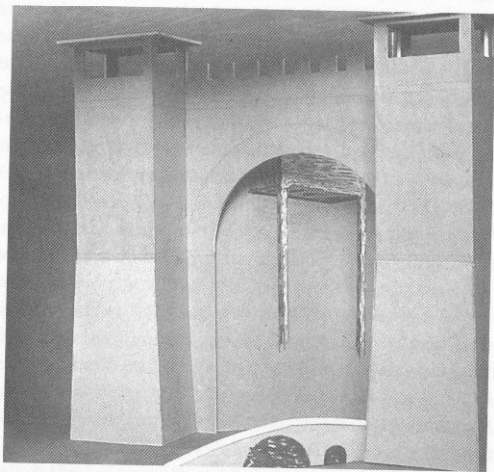


Figure 6: Parkhurst, *Model for the Front of the Stage Set for the Golden Gate*



Figure 7: *L'Arco Etrusco, Perugia, c.300 B.C.E.*
(Photograph courtesy of Alinari-Art Resources, NY)



Figure 8: Parkhurst, *Model for the Rear of the Stage Set for the Golden Gate*

special backdrop. This conjecture seems reasonable in view of the cloth roll visible around each angel's torso, just under its armpits, where the backdrop would cut into its body. Was this Giotto's invention?

Third, staging of a crowd scene contains other challenges. How on earth could Giotto have been led to accept, for *The Kiss of Judas* in the "Life of Christ" cycle, approximately 60 performers on a stage comfortable for 20? The first step toward an explanation of this incongruity is to count only the visible faces (21 or 22), then compare the other (40-some) heads in the background, which are faceless, represented only by the tops of black helmets. For the actual stage play, these massed helmets (black because of the corrosion over time of their silver leaf) may have been painted on a separate "flat," possibly with small boys crouching behind to joggle that flat and to wave spears and cressets for increased verisimilitude. Giotto thus took his cues from the real theater, problems and all. In any event, the prototype for Giotto's frescoed stages had to be a real, working stage.

Relating Some Extant Plays to Giotto's Pictures

Now let us move away from these intriguing inferences and deductions and turn to extant plays of the time. If Giotto took his inspiration from the theater, he got at least hints of its staging and sources along with the texts of its plays.²

Of several plays I have found thus far that are related, the closest is that of the Annunciation. But it could hardly be otherwise, for the play of the Annunciation was performed annually from about 1278, out of doors, in the arena, but not inside the chapel. The double stage set for the play, depicted by Giotto on the east wall of the Arena Chapel (fig. 9 shows only *The Virgin Annunciate*), I suggest, depicts or reflects a two-part set of portable stages or "chairs" carried on long poles, the documented costs for all of which were discovered by R. Zanocco in 1937 in the archives of the Cathedral of Padua, as "expenses incurred by the sacristy after due discussion . . . in the year 1305 . . . Wednesday, the 24th of March" (see Stubblebine 1969). These portable stages, and their actors, were carried in a great procession from the Cathedral to the Arena for the performance of the play of the Annunciation.

For this play, there are extant 14th-century manuscripts from Padua, which describe the occasion in detail and almost certainly record the play as performed at the consecration of the Scrovegni Chapel, on

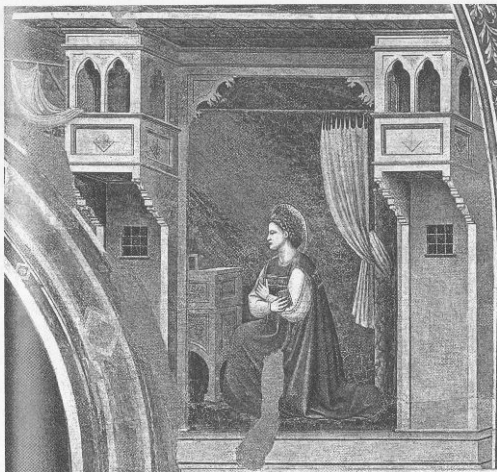


Figure 9: Giotto, *The Virgin Annunciate*, c.1302–05

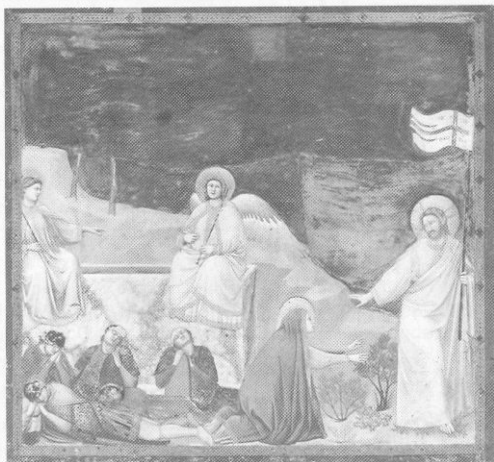


Figure 10: Giotto, *The Guard Set by Pilate and the Noli Me Tangere*, c.1302–05

March 25, 1305. These provide the dialogue, the casting, set, curtaining, gestures and movements, descent of the dove, and so on, which are generally similar to what we have in the frescoes.

I invite your attention to two other plays of Giotto's time, one with a general and the other a specific application to our two narrative cycles. The first of these is an extant text of a passion play in the archives of the cathedral in Cividale. This play includes the lamentation of Mary and others at the Crucifixion. On the Cividale manuscript (fig. 11), players are indicated in the right margin, opposite their lines. Amid the square notes on the four-line music staff, one can even detect the rubrics of stage directions. Below the staff is written the dialogue.

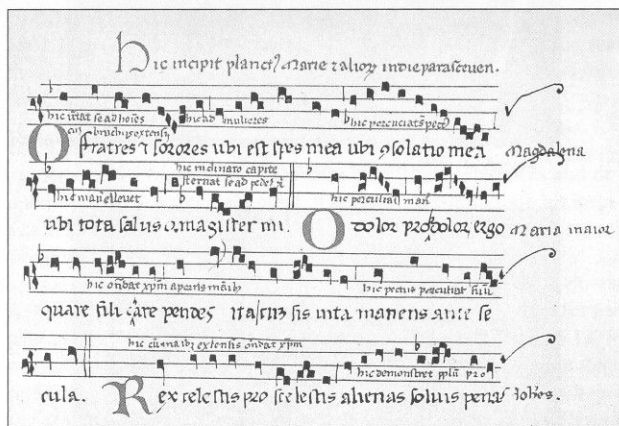


Figure 11: From *Liturgical Drama of the Middle Ages*, 1860, by E. de Coussemaker

I translate here the first five stage directions pertaining to the Magdalen's acting. You will note the care with which the rhetoric is supported by realistic gestures and postures, which could scarcely be more specific. Many details suggest a relationship with Giotto's *Crucifixion* and *Lamentation*.

(Here she turns to the men with arms extended.)

(Here she turns to the women.)

(Here she beats her breast.)

(Here she raises her hands.)

(Here, inclining her head, she seats herself at the feet of Christ.)

My second analogy is afforded by Giotto's Easter drama. Here, in one set he selects and combines moments from three contemporary plays: *The Visit of Mary to the Tomb*, the episode of *The Guard Set by Pilate* and the *Noli Me Tangere* (fig. 10). It is particularly significant that in the guard episode, five soldiers lie unconscious before the empty tomb, whereas usually but three are represented, and rarely two or four. Five guards appear only in plays written in Germany. The earliest known passion play text of this scene is of the late 13th century and comes from the monastery at Ottobeuren, Bavaria. Tellingly, it includes a conversation in Latin among five soldiers at the tomb. I believe Giotto's painting is unique in this last detail.

How could a German play reach Giotto? It may have come down the "Friuli corridor," from the German lands to Cividale, and thence to Padua or elsewhere, as I suggested above. Bear in mind that Giotto certainly was an informed man, cited in his lifetime by his home city, Florence, for *scientia et doctrina*. He also might have had connections with Ottonian Germany, perhaps through the considerable influx of Germans into northern Italy in his day, including German stained-glass-window makers at the new church of St. Francis, in Assisi.

Envoi

There is an intensity in Giotto that does not come entirely from religion, nor from the pictorial tradition. I believe it comes from the theater. As I have pointed out, there exist many archival documents concerning stagecraft and staging in the 13th and 14th centuries, and I wish to suggest that the Arena Chapel frescoes should be listed prominently among them. I believe that Giotto's previous education and/or actual experience must have included the theater. This completes Giotto's image as an artist and that of his spectators as participants, and both as lovers of religious drama.

The *Sacre Rappresentazioni* were entertainment in public life, but also religious instruction. Giotto, like a stellar professor who inspires students to be better than he, does not debase the powers of the Gospel. But in his frescoes, he provides snatches of diverse conversations from an artistic world of religious enchantment, the theater, giving these frescoes a mysterious, and silent, power.

But how silent were they? With this question I come to my final point about Giotto and the religious stage, on the importance of dialogue, for religious plays in his times were full of sound, even noisy dialogue, explication, music and singing, chanting and sound effects. These plays were, indeed, often a sort of proto-operatic production, sung in an appropriate musical mode of the day, in words of rhyming poetry, beautiful poetry. Did Giotto recognize this sound and music in his frescoes? Yes, he did: Trumpets are blown, a horn is sounded, a viol bowed, many mouths are singing or wailing, hands are raised in speaking gestures throughout—and consider the animals!

Notes

¹ The 19 scenes include the 12 frescoes dealing with the life of Mary and then seven more frescoes (including the two Annunciation frescoes) that involve Mary but overlap with the life of Christ, up to the scene of the child in the temple.

² As the reader may know, it has been proposed that Giotto's first job, apart from sheepherding on his father's farm, was to work in Umbria as an assistant-under-instruction to the Florentine artist Cimabue, head painter at that time in the basilica of St. Francis under construction at Assisi. Cimabue was drawing and painting a border of repeated modillions just beneath the windows of the apse and transepts at that time. Professor Samuel Edgerton has proposed that the assignment given by Cimabue to his new teenage helper was to follow his lead and continue this modillion molding down each side of the nave and across the front wall above the doors at the main entrance to the nave, drawing first, then painting in a finished manner something like 400 identical modillions from a high scaffolding. Edgerton tells the whole story about the teenager's skill in painting these modillions in terms of a new perspective (up to then not previously conceived by any artist, let alone by one who is your "boss"). This included the invention and the added figuring of complicated perspectives required, which Cimabue himself was clearly unaware of. In the end, the boy Giotto was correcting and modifying the ways of his old-fashioned and out-dated mentor. As far as we know, Cimabue was not offended, and maybe pleased.

Perhaps because of his inborn, and now displayed, theatrical tal-

ents for perspective while at Assisi, Giotto is likely to have connected with a lay confraternity in nearby Perugia, where he would have been found most useful with respect to theater performances being staged by the Confraternity of St. Andrew, one of the earliest producers (perhaps before 1300) of religious plays in that city. The St. Andrew group compiled a book of lauds (read "hymnbook"), and also a playbook (of well over 100 plays), both of which are extant only in later copies.

Annotated Bibliography

Barr, Cyrilla. *The Monophonic Lauda and the Lay Religious Confraternities of Tuscany and Umbria in the Late Middle Ages*. Early Drama, Art and Music Monograph Series 10. Kalamazoo: Medieval Institute Publications, Western Michigan U, 1988.

A rich source for both musical and nonmusical information.

Cole, Bruce. *Giotto and Florentine Painting, 1280–1375*. New York: Harper, 1976.

The author justifies his reputation as an excellent teacher. Recommended for its thorough and lucid presentation without belaboring the problems. Well thought out and consistently articulate.

Edgerton, Samuel Y., Jr. *The Heritage of Giotto's Geometry: Art and Science on the Eve of the Scientific Revolution*. Ithaca: Cornell UP, 1991.

By one of our most gifted and readable scholars in the high-speed field that joins science, art and history, who has a gift for unknotting complicated subjects and displaying them as a necklace of new ideas, sparkling with verve. A must-read section on the young Giotto's first job at Assisi.

Eisenbichler, Konrad, ed. *Crossing the Boundaries: Christian Piety and the Arts in Italian Medieval and Renaissance Confraternities*. Early Drama, Art and Music Monograph Series 15. Kalamazoo: Medieval Institute Publications, Western Michigan U, 1991.

Experts discuss a variety of subjects pertaining to this period.

Hardison, O. B., Jr. *Christian Rite and Christian Drama in the Middle Ages: Essays in the Origin and Early History of Modern Drama*. Baltimore: Johns Hopkins, 1965.

These essays by the late director of the Folger Library, Washington, D.C., are brought together in a handy volume that is authoritative and a pleasure to read.

Hills, Paul. *The Light of Early Italian Painting*. New Haven: Yale UP, 1987.

A rare topic, treated with skill and deep knowledge. Chapters 2, 3 and 4 pertain to Giotto's Arena Chapel frescoes and those artists who proceeded or followed him, to light and color, and to the color scientists of the day. Abundantly illustrated and footnoted.

Stubblebine, James H., ed. *Giotto: the Arena Chapel Frescoes*. New York: Norton, 1969.

This contribution to the Norton Critical Studies in Art History provides excellent coverage of the frescoes in an introductory essay, with the addition of background material and criticism from outstanding authors, much of which is hard to come by.

Young, Carl. *The Drama of the Medieval Church*. 2 vols. Oxford: Clarendon, 1933.

Although almost 70 years old, this text is still very useful, because it covers the relevant dramatic liturgy of the Church of Rome and goes into detail of plays, among many others, associated with the Resurrection, the Passion, the Nativity and the Virgin Mary.

Book Review

Water out of a Woodland Spring

John Fowles and Nature, "Fourteen Perspectives on Landscape"
Edited by James R. Aubrey
Associated University Presses, 1999

BY TONY GENGARELLY

The breakwater at Lyme-Regis, known as the Cobb, describes a beautiful arc as it curves into the rough seas of the English Channel off the southern coast of England. If we close our eyes, perhaps we can see—balanced on the tip of this projection into the wild ocean, seemingly united with the power of the natural world—the figure of a woman, Sarah Woodruff, the haunting heroine of John Fowles's best-known work, his 1969 novel *The French Lieutenant's Woman*. Sarah, one of many connections to wild nature in the literary work of Fowles, is drawn out of the author's elemental relationship to the natural world. This connection is variously explored by several scholar-writers in a 1999 volume of essays, *John Fowles and Nature*, edited by James Aubrey. The authors' viewpoints cover a variety of disciplines, from geology to ecofeminism. With its captioned photographs that add greatly to the appreciation of the written text, this book is a must read for anyone looking for well-informed and beautifully articulated literary criticism.

Thanks to the lucid quality of the prose—expertly organized and edited by Aubrey—one does not have to be a devotee of John Fowles to appreciate the author's search, and that of his fictional characters,

for self-actualization through the experience of wild nature. This volume reaches through Fowles's long and productive career to locate him in a variety of settings, from Greek islands to the pueblo ruins of the American Southwest. Always preferring the unique, remote places, Fowles turns a number of traditional associations upside down as he embraces the untamed islands of nature. For Fowles, man *is* an island and the moments of personal encounter with the wild, when people are most isolated from the familiar hold of civilized living, are those of growth toward personal freedom as well as integration with the larger universe (Aubrey 27–30). Wilderness, then, is the central feature of the natural world, the place beyond the mythical gardens—Eden or Arcadia—from which we need to be expelled to begin the process of awareness and human development. Fowles, similar to Loren Eisley, has a scientist's knowledge of nature without the need to classify and organize it for utilitarian purpose. Nature simply is and as such offers a life resource that resonates within us all. Fowles's home, Belmont, near the Undercliff above the seacoast village of Lyme, not only nudges the location of his best-known novel but features as well a "wild garden," or "English Garden of Eden." It is the unkempt portions of the natural world, therefore, that provide Fowles with many of his literary themes. The more prominent of these—evolutionary progression, the "inverted pastoral" and the Green Man myth—are explored at some length by the authors.

For Fowles, landscape suggests earth history and that, in turn, implies evolution. Just beneath the surface of the planet is the discovery of geological or "deep" time to remind us of "the relative insignificance of the lives of individuals against the sweep of time and history" (Padian 160). This broad view introduces not only a sense of orderly progression but the inevitability of change and the randomness of natural selection. Fowles sees evolution as an existential reality—something that impacts on the here and now—rather than abstract theory. It is through the recognition of this reality that people have the chance to adapt, to attain self-actualization by shedding the social conventions that present an illusion of control. The principal male protagonist in *The French Lieutenant's Woman*, Charles Smithson, is an amateur geologist, something the leisure time of his privileged status makes possible. He is also an avid student of the work of Charles Darwin. He is, however, unaware that his radical ideas, which challenge the pre-

cepts of religion, may also apply to the inevitable demise of his own social class. Charles's experiences with the wild nature of the Undercliff, where he occasionally wanders while searching for fossils embedded in the cliff rocks above and below, unravel his neat theories and confront him with the elemental forces that are moving beneath his comfortable universe. Fowles casts Smithson in the role of quester, the male hero who undergoes transformation through an encounter—in this case, with wild nature. Through this experience, Charles comes to recognize those forces that will carry his destiny to places where he no longer sits as the apogee of evolutionary “progress.” Fowles’s determinism, though, is balanced with the idea that reality, once acknowledged, can liberate the individual to make adjustments, quality choices that lead not only to self-discovery but to a new level of adaptability and survival.

Fowles uses another theme, the “inverted pastoral,” to punctuate the role of wild nature in the personal evolution of his protagonists. The traditional Edenic or Arcadian pastoral is a location of peace and tranquility that lies outside time, a retreat that provides a “vision of the ideal to take back to civilization” (Beatty 170). However, Fowles’s characters need to fall from their imaginary Edens into the wilderness of experience, to confront the elemental forces in wild nature that are resonant in themselves: “Fowles sets up a pastoral frame of reference and simultaneously undercuts it” (Beatty 171). It is as if the author had in mind the 19th-century landscape paintings of Constable and Turner, the former presenting the rural tranquility of a bucolic ideal, the latter introducing the rhetorical sublime with its wild and elemental forces. In *The French Lieutenant’s Woman*, Fowles uses a variety of images and experiences to punctuate his characters’ “fall”: the noisy call of the wren that defies classification and represents the parity of all existence; the presence of an Eve, an anima spirit, in the person of Sarah Woodruff, who initiates Charles into the subversive elements of wilderness: “With Sarah in the Undercliff, Charles steps out [of his comfortable, male-dominated world] into a wild, primeval place, a place offering the potential for direct, unsublimated experience—sensual, sexual, emotional, physical” (Ross 188). Sarah is inextricably connected to the wild places she frequents, “the physical correlatives of her psychic landscape and emotional weather” (Ross 187). This association is made beautifully apparent as Fowles describes Sarah’s sor-

row "welling out of her tragic face 'as purely, naturally and unstoppably as water out of a woodland spring'" (Ross 186). So the pastoral myth, with its spiritual and transcendental overtones, is recast by Fowles as a static refuge that limits freedom and personal evolution. Aware of his own century's reaction against the taming of the wild, Fowles invites the reader to participate in a liberating rite of nature: "Thus Fowles's true Eden . . . is predicated on the evolutionary process; paradoxically, it necessitates its own loss, a 'fortunate fall' into the recognition of reality, undiluted and unmediated by a pastoral myth that may inhibit the individual's personal growth" (Beatty 178).

The nature of nature for Fowles is found in the Wild, represented by the mythical Green Man. In *The Tree* (1983), Fowles describes the Green or "Wild" Man as a numinous source of creativity and self-expression, something that needs to be protected from a world that would reduce it to a mere classifiable thing. Tracing the evolution of the Green Man to the English story of Robin Hood, an outlaw taking refuge in the Green Wood, Fowles expands on the need for civilized people to embrace wild places in order to nurture their own creative potential: "Some such process of retreat from the normal world . . . is inherent in any act of artistic creation. . . . And a part of that retreat must always be into a 'wild,' or ordinarily repressed and socially hidden self. . . . The return to the green chaos, the deep forest and refuge of the unconscious" (Fowles 75-76). Western civilization's fear of the unknown external world and the subconscious self, often represented by natural wilderness, has inspired the desire to clear the forests, to use them for lumber, to expose the refuge of the Green Man. Fowles speaks out against this fear-driven desire to civilize, objectify and confine the free spirit of the woods inherent in all of us.

In Fowles's autobiographical novel, *Daniel Martin* (1977), the questing hero searches out those natural places where personal transformation is possible: "These are the settings that evoke the majesty, mystery, and power of Nature; that provoke epiphany and whole vision . . . that challenge conventional notions of language and time and enable profound transformations of feeling and perception" (Olshen 108). In Fowles's 1974 novella, *The Ebony Tower*, his artist-hero, Henry Breasley, undertakes a rearguard action against abstract art that represents "the turning away from nature and the physical world on the one hand; and the fear of the body, desire, and appetite on the other"

(Olshen 109). Paradoxically, early modern art used abstraction to embrace the primitive, to free the artist from civilized constraints. Gauguin's refuge in Brittany and the South Sea islands, the Worpswede movement in German art and the Fauves or "wild beasts" sought to tap the "green chaos" found in traditional, indigenous societies as well as the human subconscious.

Fowles found his own wilderness refuge in Belmont, near the Undercliff, which became for him in *The French Lieutenant's Woman* the central place where those who were exiled *to* or *from* the regenerative powers of the wild might locate.¹ It is, of course, Sarah Woodruff who is identified with wild places, with the tip of the Cobb and the Undercliff where she wanders. Having been banished *to* these natural places, as a woman and social outcast, Sarah embraces wild nature to achieve her freedom. Charles Smithson, as a representative of the male-dominated social order, is accordingly exiled *from* the wild and needs a "fortunate fall" into the "green world" to begin the process of discovering the larger realities that condition his life. So, ultimately, one learns from these essays in this very perceptive volume that "the world of nature . . . rather than a marginal location . . . is instead a central place . . . resonant with the green chaos in all of us" (Ross 192).

¹ Traditionally, the Undercliff was a secret gathering place for Puritan dissenters in the 17th century, who congregated at Whitechapel Rock, a totemlike projection in a thicket of Undercliff woods. Here the wilderness protected and fostered the Puritan need for religious freedom. Ironically, once the Puritans established their "City on the Hill" in Massachusetts, they began to fear the wilderness as a refuge for those who would undermine their holy mission. The forests became the abode of witches and "red men," Quakers and freedom lovers, who were perceived as agents of the Devil by God's "elect."

Works Cited

- Aubrey, James R. "Introduction." *John Fowles and Nature*, "Fourteen Perspectives on Landscape." Ed. James R. Aubrey. London: Associated UP, 1999.
- Barnum, Carol M. "The Nature of John Fowles." *John Fowles and Nature*.
- Bawden, Liz-Anne, Kevin Padian and Hugh S. Torrens. "The Undercliff of John Fowles's *The French Lieutenant's Woman*: A Note on Geology and Geography." *John Fowles and Nature*.
- Beatty, Patricia V. "The Undercliff as Inverted Pastoral: The Fowlesian *Felix Culpa* in *The French Lieutenant's Woman*." *John Fowles and Nature*.
- Fowles, John. *The Tree*. New York: Ecco, 1983.
- Olshen, Barry N. "The Archetype of the Green Man in the Writings of John Fowles." *John Fowles and Nature*.
- Padian, Kevin. "Deep Time, Evolutionary Legacy, and the Darwinian Landscape in John Fowles's *The French Lieutenant's Woman*." *John Fowles and Nature*.
- Ross, Suzanne. "'Water out of a Woodland Spring': Sarah Woodruff and Nature in *The French Lieutenant's Woman*." *John Fowles and Nature*.

Book Review

Intellectual Fads

Thinks . . . by David Lodge
Viking Penguin, 2001

BY MEERA TAMAYA

David Lodge is one of those rare protean and prolific writers who practice their craft successfully in multiple genres: novels, plays and criticism. For years he was also an academic, affiliated with the University of Birmingham. However, he is best known for his hugely entertaining novels satirizing the theoretical battles fought, often pompously and always humorlessly, in the groves of academe. *Changing Places*, *Small World* and *Nice Work*, for example, pillory well-known literary theorists and the hostilities between town and gown.

Since Lodge's antennae are always aquiver to register the slightest shifts in the winds of intellectual fashions, it is not surprising that his latest novel, *Thinks . . .*, takes on the "problem" of consciousness, the current hot topic debated by neuroscientists, psychiatrists, philosophers and linguists. Consciousness—the complex web of thoughts, feelings, memories of the past and intimations of the future that constitutes our interior life—is perceived as a "problem" by the intelligentsia partly because the computer's increasing usurpation of the brain's functions has brought into question what was traditionally considered a uniquely human attribute. All of us remember the defeat of Garry

Kasparov, the chess master, by the IBM computer Deep Blue. As Artificial Intelligence, or A.I., becomes a possibility, the mechanical replication of consciousness looms in the not too distant future.

Or so believes the eponymous Ralph Messenger (a harbinger of the future?), Professor and Director of the Holt Belling Center for Cognitive Science at the fictional University of Gloucester. *Thinks . . .* begins with the recording of Messenger's most private thoughts and feelings as he dictates into his Olympus Pearlrecorder, in his own words, "The object of this exercise being to try to describe the structure of, or from which one might infer the structure of . . . thought." Messenger's consciousness is driven by twin goals: vigorous self-promotion and the satisfaction of his libidinal urges. When he is not planning his career advancement, he is savoring his past and plotting his future sexual exploits. He is not above hiding the recorder under the pillow of his latest sexual partner without her knowledge. Messenger, of course, has no truck with old-fashioned ideas of God or the existence of a soul. Indeed, he thinks consciousness is a synchronized affect of various brain functions and, as such, will be replicated by a computer in the near future.

Messenger's biological reductionism is anathema to the woman he pursues and, finally, wrangles into bed: Helen Reed, a visiting professor of creative writing. Helen, a recent widow and a successful novelist, is a lapsed Catholic who is not yet ready to give up entirely on comforting notions of God and the immortality of the soul. Also as a writer of old-fashioned realistic novels, she fights a rearguard action against postmodern, poststructuralist deconstruction of the subject and its attendant notions of individual, autonomous identity. Messenger and Reed represent what C. P. Snow in a 1959 lecture called the Two Cultures: the Sciences and the Humanities, which, according to Snow, exist in mutually uncomprehending opposition. Messenger's courtship of Helen (under the nose of his rich American wife, who is also having her own adulterous affair) is conducted largely like an intellectual seduction. He has to break down her distaste for a liaison with a married man as well as her steadfast loyalty to passé ideas of soul, self, subject, identity, etc.

Their affair follows its banal, very predictable course and Lodge, who has written extensively on the novel, cannily has Helen justifying adultery as a plot device: "There's not a great deal of narrative

mileage in the stable monogamous marriage." Besides Reed and Messenger, almost everyone in the novel is playing musical beds, but the extramarital lovers come across as marionettes, doing the bidding of the novelist to provide some sexual ballast to all the intellectual hot air.

Messenger and Helen's intellectual conflict provides Lodge with a narrative strategy for making complex ideas about consciousness intelligible to the general reader. Playing the naïf, Helen questions Messenger, enabling him to expound and explain recent developments in cognitive studies, beginning with Descartes' formulation "*Cogito, ergo sum*": I think, therefore, I am. His dictations into the Pearlcarder and pages from her diary provide alternating points of view, intermixed with the third-person authorial overview.

As in *Small World*, the denouement of *Thinks* . . . occurs at an international conference on Consciousness Studies known as Con-Con to its habitués. Messenger enlists Reed to give the final lecture, "The Last Word," and she points out that "consciousness . . . is to modern science what the philosopher's stone was to alchemy: the ultimate prize in the quest for knowledge." As an unreconstructed humanist, she goes on to proclaim that "literature is a written record of human consciousness." In support of her heartfelt defense of a nonscientific view, she cites Andrew Marvell's poem "The Garden," in which "We can see the fruit, we taste it and smell it with what has been called the thrill of recognition and yet it is not there, it is the virtual reality of the fruit."

Reed sounds like a stand-in for Lodge, the novelist, but the irony is that *Thinks* . . . fails to convey the "virtual reality" of a fictional world. That the novel is merely a vehicle for an intellectual debate is all too apparent, and, consequently, the characters are not fully fleshed and engaging. The wit and inventive exuberance of his earlier novels are also missing, as if the subject of consciousness is too serious to be trifled with. Indeed, the novel could have been more accurately titled *A Guide to Recent Developments in Cognitive Studies*—it works better as a guide than as a novel.

Contributors

Tony Gengarellly teaches art history and museum studies at Massachusetts College of Liberal Arts. He has written several articles and books, including a 1989 catalog, *The Prendergasts and the Arts and Crafts Movement*, and a 1996 monograph, *Distinguished Dissenters and Opposition to the 1919–1920 Red Scare*. His essay on Frederick Strothmann's poster "Beat Back the Hun with Liberty Bonds" appears in *American Dreams: American Art to 1950 in the Williams College Museum of Art*. He has also contributed an entry, "Poster Art," to *The Guide to United States Popular Culture*.

Sara Littlecrow-Russell is Métis and lives in Boston, where she attends Northeastern Law School. Her poems have appeared in *US Latino Review*, *Red Ink*, *American Indian Quarterly*, *Femspec*, *The Massachusetts Review*, *Flyaway*, *Hip Mama*, *RaceTraitor Journal*, *Survivor* and a variety of anthologies, including the forthcoming New Rivers Press anthology *Sister Nations*. Her poem "Ghost Dance" appears in *All Our Relations: Native Struggles for Land and Life*, by Winona LaDuke.

Joe Mazur is a professor at Marlboro College, where he has taught mathematics since 1972. For the past 15 years, he has been publishing educational, interactive multimedia software. Joe is the author of many software packages that accompany more than 20 textbooks from five areas of elementary college mathematics. He is the author of *Explorations in Calculus*, a multimedia CD package of simulations for first-year calculus. The essay that appears in this issue is the first chapter of a book he is currently writing, *What I Tell You Three Times Is True*.

Charles Parkhurst is an art historian who lives in Amherst. He served as a U.S. Naval Reserve combat officer during World War II, after which he aided the art search-and-rescue efforts of the U.S. Army of Occupation in southern Germany. Parkhurst was professor and chair of the Department of Fine Arts and director of the Allen Memorial Art Museum of Oberlin College from 1949 to 1962, director of the Baltimore Museum of Art from 1962 to 1970 and assistant director and chief curator of the National Gallery of Art from 1971 until his retirement in 1983. Since then, he has been acting director of the Williams College Museum of Art and of the Williams College Graduate Program in the History of Art and interim director of the Smith College Museum of Art. In the spring of 2001, he was lecturer in residence at Massachusetts College of Liberal Arts. Parkhurst has published articles and books on museum management, art history and the history of color science.

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THE MIND'S EYE

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